

Remarks/Arguments

Applicant thanks Examiner Le for his patience and his careful examination of this application; and for the clear explanation of the final rejections in the Office Action and in the telephone interview on September 9, 2005. In response, applicant cancels claims 2, 5, 7, 12, 17-27; amends claims 1, 3, 4, 6, 8-11; and inserts new claims 28 and 29.

Applicant respectfully submits that the pending claims now distinguish over the cited references and stand patentable:

Claim 1

Claim 1, as amended, describes a interconnect structure that has an additional limitation – the conductive contact pad has a first elastic modulus, the compliant layer has a second elastic modulus; and the second elastic modulus is lower than the first elastic modulus. This limitation is not disclosed in the Lee patent.

The Lee patent discloses a thermally compliant multi-layer wiring structure that incorporates an “empty” or air gap under the interconnect wiring.¹ It is well-known in the art that an empty or an air gap does not have an elastic modulus. Therefore, the compliant layer element in claim 1 is missing in the Lee patent. Because the Lee patent does not disclose all the elements in claim 1, it does not anticipate claim 1.

The additional element of limitation was described in Claim 2, which is canceled from this examination. The Office Action combines the Lee patent with the Fjelstad patent in rejecting claim 2 for obviousness. Applicant respectfully submits that the combination is improper because it would destroy the purpose and the function of the Lee structure.

It is noted in the Office Action that Fjelstad discloses a interconnect structure wherein the compliant layer 140, being formed from a compliant material that has an elastic modulus lower than the elastic modulus of the material used to form the contact pad 150.² The Office Action notes that it would have been obvious to use the compliant layer 140

¹ See US 6,806,570, Abstract.

² See Office Action, p. 4, ¶6, July 14, 2005.

to replace the air gap 32 of Lee. However, Lee teaches, in the SUMMARY OF THE INVENTION section that

[t]he "empty" or air gap under the interconnect metallurgy and solder balls results in a compliant structure that does not transmit thermally induced stresses to the solder ball.³

Therefore, to replace the "empty" or air gap under the interconnect metallurgy and solder balls would allow thermally induced stress to transmit to the solder balls and thus destroy the purpose and the function of this wiring structure.

Applicant respectfully submits that the Lee patent fails to disclose a compliant layer of low elastic modulus and this deficiency can not be cured by combining with the Fjelstad patent. Therefore, claim 1 stands patentable over the cited references.

Claims 3, 4, 6, 8-11, 28, and 29

Claims 3, 4, 6, 8-11, 28, and 29 properly depend from claim 1 with additional claim limitations. In particular, claims 3, 28, and 29 further limits the contact pad to a metal; claim 3 further limits the compliant layer also to a metal; claim 28 further limits the compliant layer to a polymer, claim 29 further limits the compliant layer to a dielectric material; claim 4 further limits the contact pad to copper and the compliant layer to a lower elastic modulus material; claim 6 further limits the structure of the compliant layer; claim further limits the relative property of the inner and outer portions of the contact pad; claim 9 further limits the dimension of the opening; claim 10 further describes an additional solder contact attached to the contact surface; and claim 11 further limits the relative thickness of the compliant layer and the contact pads. Not all these elements are disclosed in the Lee patent and the Fjelstad patent. Applicant respectfully submits that claims 3, 4, 6, 8-11, 28, and 29 stand patentable over the cited references.

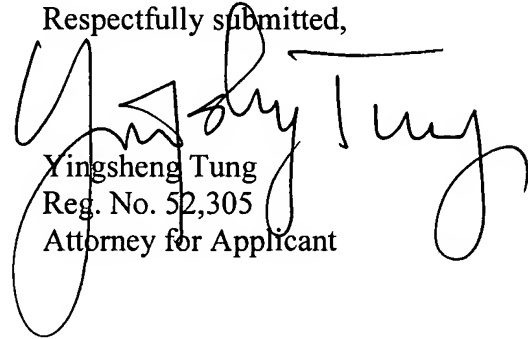
³ US 6,806,570, col. 3, ll. 3-5.

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In summary, applicant respectfully submits that this application is in allowable form and all pending claims distinguish over the cited references in the Office Action. Applicant respectfully requests further examination of this application and timely allowance of the pending claims.

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Respectfully submitted,



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